

Bull breeding soundness evaluation in Southern Africa

P.C. Irons^a, J.O. Nöthling^a and H.J. Bertschinger^a

^aSection Reproduction, Department Production Animal Studies, Faculty of Veterinary Science, University of Pretoria, P. Bag X04, Onderstepoort 0110, South Africa

Abstract

The motivation for and process leading up to the publication of a new bull breeding soundness certification standard endorsed by the South African Veterinary Association is described. The veterinary certificate of bull breeding soundness and explanatory notes and minimum standards are shown. The first component of the certificate is a declaration by the veterinarian that the bull complies with the minimum standards set for examinations for the selected purpose, these being for use as a natural service sire, as a donor of semen for distribution, and for insurance purposes. This is followed by the details of the bull and owner, and a list of the recommended examinations and tests for the bull with provision for which were performed. Certificates are available in book form with the explanatory notes and minimum standards on the reverse, and a carbon copy which remains in the book. The clarity and ease of completion of the document are regarded as being positive features. Bulls are either classified as breeding sound or not, with no actual parameters indicated on the document and no certificate issued for those which do not meet the set criteria. Contact details of the parties involved are shown on the certificate to allow for communication as a means of avoiding disputes.

Keywords: Bull breeding soundness; Certification; South Africa

1. Introduction

Evaluating the fertility of bulls, prior to use as breeding animals would make obvious economic sense if it were possible. Practically it is not possible to predict fertility by means of a breeding soundness evaluation. Applying minimum standards to a set of accepted procedures, however, enables one to make a decision with regard to the breeding potential of the bull. An animal found to satisfy these criteria is deemed to be breeding sound, and the procedure of

performing such a set of tests is a breeding soundness evaluation [1].

The cattle breeder using natural service is reliant on the fertility of the bulls for the productivity of his operation. He also seeks to minimise the risk of the bulls infecting the cow herd with a disease with potentially serious consequences. The veterinary practitioner is ideally placed to evaluate the bull with the aim of detecting common causes of infertility, and to do the necessary testing and take appropriate samples to confirm freedom of disease.

The change of ownership of a bull introduces another set of considerations which must be combined with the basic biological and managerial factors affecting use of the bull. A change of herd holds the risk of introduction of infectious diseases to the destination herd. In addition, there is the expectation of a certain level of performance from the animal and the ability to rectify the situation should this expectation not be met.

The logical end point where animals are subjected to breeding soundness evaluations is the issuing of a certificate by the practitioner for those animals which fulfill the set criteria. Besides the selection of the tests and the methods to be used for each, the legal implications of certification add another layer of complexity to the procedure. Certification has grown into an important role of the veterinary profession. As the financial value of products and the responsibility inherent with this important task have gained increased recognition so the legal ramifications of certification have become increasingly important. The principles of certification are as applicable to a bull as they are to any other product, despite the unique aspects inherent to the use of breeding bulls.

A breeding soundness certificate does not guarantee fertility or the absence of risk of transmitting ill effects to herds the bull is used on, but it suggests a

reduced risk due to certain causes. The benefits of examining bulls for breeding soundness are well-documented. Bulls classified as satisfactory for breeding soundness achieved a 9% higher pregnancy rate in a breeding period in single-sire breeding herds than bulls of questionable breeding potential [2]. Bulls which are unsatisfactory could be completely infertile with total loss of the potential calf crop in the single-sire situation. Examples of conditions which cause infertility and which are easily detected are lameness [3], persistent frenulum [4], poor sperm morphology [5], and Trichomonosis [6]. For this reason the evaluation of breeding soundness of bulls prior to use is recognised as an integral part of sound herd management in many countries. A cost-benefit analysis of breeding soundness evaluation suggested a direct, short-term financial benefit to be gained by producers under South African conditions [7].

As the practice of the evaluation of bulls evolved, so did a range of services. While the main components of the examination are dictated by the main causes of infertility, the methods used to evaluate these components, depth of the examination, and additional aspects included in the examination vary greatly between practitioners. Advances in veterinary research have led to the introduction of new approaches in this field, and the challenging of some earlier beliefs. Such changes are not adopted in a uniform fashion by all individuals, increasing the tendency towards variation in the application of field examinations. Such variation is a source of dissatisfaction to both clients and practitioners, both groups experiencing inconsistency in the costs and outcomes of the examinations. This situation resulted in some loss of credibility of breeding soundness evaluation in South Africa, and erosion of the perceived value of the procedure.

The motivators mentioned in the preceding paragraph led to production of the first standardised set of guidelines for bull breeding soundness certification by the South African Veterinary Association in 1989. This parallels the situation in other countries, where similar requirements for standardisation resulted in the development of guidelines for bull breeding soundness certification by the Society for Theriogenology in 1983 [8], with an updated set of guidelines being published in 1993 [9]. A recent article describes the process of devising

an industry standard for examination of bulls in Australia [10]. In this context the revised South African standard of 2000, which has been in use for six years and has been recently updated, is presented here.

2. Materials and methods

The Livestock Health and Production Group of the South African Veterinary Association convened a working group to revise the existing guidelines. Specific requirements for the revisions were to clearly define what tests should be included in the standard breeding soundness evaluation, and to review recent literature to provide evidence-based standards for each parameter where possible. The brief was for a document which was simple enough to gain wide acceptance in the industry, yet clear enough to eliminate doubt as to what the standards were. In particular, the guidelines should aim to reduce the potential for disputes arising out of the transfer of a bull to a new owner and subsequent unsatisfactory performance of such a bull.

Clinicians of the Faculty of Veterinary Science took the lead in formulating a draft certification document, which was then circulated within the veterinary profession, to breeders groups, and to the main livestock insurance underwriter for comment. Once a set of guidelines had been agreed on, this was presented to veterinarians in a series of workshops in different regions of South Africa and in Namibia and, after having considered their input, the certificate was finalised and made available in print form by the South African Veterinary Association.

When the need arose for a second print run of certificates input was solicited from practitioners via the branch structure of the veterinary association and via an electronic discussion forum to which a large proportion of practitioners subscribed. Minor changes to aspects which had proven to be problematic during field application of the standards were made.

3. Results


The standard veterinary certificate of bull breeding soundness is shown in [Fig. 1](#), and the accompanying explanatory notes and minimum standards in [Fig. 2](#).

Veterinary Certificate of Bull Breeding Soundness

I the undersigned, being a veterinarian registered with the South African Veterinary Council, hereby certify that on this ____ day of _____ 20__, at _____, on the request of _____, I performed the examinations and tests as indicated hereunder on the bull identified below. In my opinion the bull is breeding sound in terms of the standards listed on the reverse side of this certificate for the purposes of (encircle the letter):

A: Sale or own use	B: Semen donation for the purposes of sale	C: Insurance
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Identification of the bull

Breed: _____ Age: _____ Colour: _____
 Tattoos: _____ Brand: _____
 Ear notches: _____ Ear tags: _____
 (drawn in) **R**  **L** Name: _____

Name of owner: _____
Residential address: _____
Telephone: _____ **Fax:** _____

Residential address of the animal (at the time of examination): _____

Examinations and tests: (Those tests for which the "Done" blocks are circled were performed whereas those for which the "Not done" blocks are circled were not performed).

	Circle the options that apply to the bull		Use classes for which tests are recommended			Reason not done: (not necessary to complete if test not indicated for this bull)
			A	B	C	
General clinical examination			A	B	C	Test must be done
Detailed clinical examination	Done	Not done		B	C	
Examination of the genital system			A	B	C	Test must be done
Semen collection and evaluation			A	B	C	Test must be done
Contagious abortion (blood test)	Done	Not done	A	B	C	
Tuberculosis (skin test)	Done	Not done	A	B	C	
Trichomonosis (sheath wash or scraping)	Done	Not done	A	B	C	
Number of tests for trichomonosis	0	1	2	3		
Campylobacteriosis (sheath wash or scraping)	Done	Not done	A	B	C	
Number of tests for Campylobacteriosis	0	1	2	3		
Bovine virus diarrhoea (antigen test)	Done	Not done	A	B	C	
Serving ability	Done	Not done		B	C	

Other tests (specify): _____

Further comments: _____

Signed _____ Address or stamp of practice: _____
 Name _____
 Qualification _____ SAVC no. _____
 Date _____ day of _____ 20 _____

See reverse side for minimum standards and explanatory notes

Fig. 1.

Explanatory Notes and Minimum Standards

Definition

A bull is certified as breeding sound if it passes a specified battery of tests relating to reproductive well-being. The extent of the list of tests and, hence, the scope of a breeding soundness certificate may vary, depending on the need. A breeding soundness certificate does not guarantee fertility or the absence of risk of transmitting ill-effects to herds the bull is used on, but it suggests a reduced risk due to certain causes.

Bulls for which a breeding soundness certificate is not issued are not necessarily infertile, of low fertility or pose a risk of transmitting ill-effects to herds they are used on. It is not essential to have a breeding soundness certificate in order to use, buy, sell or insure a bull but the associated risk is carried by the user and (or) seller and (or) buyer and (or) insurer.

Clinical examination

A general clinical examination must be done in all cases. It is accepted to consist of visual inspection of general health status, condition score (2-3½ out of 5 acceptable), eyes, bite, legs, gait, and conformational defects. A detailed clinical examination includes assessment of the digestive, respiratory, circulatory, and locomotory systems and integument in addition to the above.

Examination of genital system

Must be done in all cases.

Sheath: Inspect and palpate. Should not hang lower than the line from the knee to the hock

Penis: Palpate the whole penis from the S-bend distally. Attempt to extrude and visualise during semen collection. If the penis was not seen with a full, normal erection this should be indicated under "Comments".

Scrotal circumference:

Minimum standards according to breed and age (months)

Breed	18 m.	21 m.	24 m.
Bos taurus	32cm	33cm	34cm
Zebu (Brahman)		32cm	32cm
Synthetic Bos taurus x Bos indicus		32cm	33cm
Indigenous			32cm

Alternatively, breed minima may be applied where available, providing they exceed these guidelines.

Testes: Mobile, symmetrical, firm, elastic, with no palpable irregularities. Rotation and slightly uneven height acceptable unless specified by breed society.

Epididymides: Symmetrical, even consistency, normal size throughout.

Scrotum: Neck and scrotal skin normal, testes mobile, ventral cleft ≤3cm.

Internal genital organs: No palpable abnormalities of ampullae, prostate, vesicular glands and pelvic urethra.

Semen evaluation

All of the following evaluations should be done in all cases:

Volume: Only reliable if collected by artificial vagina, but should be recorded in all cases

Colour: White, ivory or yellow

Consistency: Classified as follows:

Description	Approximate sperm concentration
Thick creamy	2,5 x10 ⁹ /ml

Creamy	1,75 x10 ⁹ /ml
Thin creamy	1,0 x10 ⁹ /ml
Milky	0,5 x10 ⁹ /ml
Watery	0,2 x10 ⁹ /ml
Minimum standard: Milky or thicker	

pH: 6,2 – 7,4

Mass motility: Scored as follows:

0	No motility
1	Few motile sperm, <10% alive
2	Many motile but no wave motion
3	Slow waves visible
4	Well-defined, strong waves with rounded turns, reaching periphery
5	Waves as for 4, but with a whiplash effect

Minimum standard: ≥2 out of 5

Individual sperm motility: ≥70% linear motile

Foreign cells: High numbers of spermatogenic cells are unacceptable. Leukocytes and bacteria are unacceptable if there are indications that they do not originate from the preputial cavity.

Morphology: ≥75% normal sperm with no indication of a progressive disorder of the reproductive tract or known heritable morphological defect.

Contagious abortion and Tuberculosis:

In cases where the herd is known by the practitioner to be negative for contagious abortion and tuberculosis, this status has been confirmed at a recent herd test, and the herd is closed, this is acceptable justification for not retesting each animal.

Trichomonosis and Campylobacteriosis:

Currently available tests are only 75-90% sensitive. Three tests are therefore necessary to certify an animal free of these diseases with a high degree of certainty. Practical implications may preclude complete testing of all animals.

Serving ability

This test is required for animals in use classes B and C and recommended for category A. A healthy female in oestrus or restrained in service stocks is required. The bull's reaction time and ability to mount, achieve intromission and to thrust are assessed. Covering should be achieved within 5 minutes in experienced bulls, and within 10 minutes in young bulls. Longer periods may be allowed for *Bos indicus* bulls.

Other examinations or tests

Optional additional tests include a serving capacity test, tests for other infectious diseases such as leptospirosis, tests for genetic defects and additional tests that an insurer may require.

General recommendations

This certificate indicates the status of the animal at the time of examination. However, arrangements for examinations should be made a month before the certificate is required to allow for the complete evaluation of all bulls.

The user must observe the bull for breeding activity and serving ability at the beginning of the breeding season.

In the case of purchase of a bull, show this certificate to the local veterinarian and consult him/her regarding further actions which should be taken prior to use of the bull.

Copies of certificates, records and smears are retained by the veterinarian for a minimum of three years.

Fig. 2.

The first paragraph of the document consists of a declaration by the veterinarian that the bull was examined for the selected use class and complies with the minimum standards for this use class. The person or entity who commissioned the certification is also specified in this paragraph, indicating the legal ownership of the information.

The second, third and fourth paragraphs make provision for description and identification of the bull, the name and contact details of the owner, as well as location where the animal is kept, the latter being a requirement for certification by the South African Veterinary Council. Provision is made for all of the commonly used identification methods. Where unequivocal identification methods are not already present on the animal, practitioners are encouraged to apply tamper-proof ear tags during the course of their examination.

The fifth paragraph is a list of the examinations and tests, indicating which are recommended and which were performed on each bull. Certain of these are regarded as integral to the evaluation, without which the bull cannot be evaluated. For the remainder, provision is made for circumstances under which the practitioner assesses the risk of omitting that test as acceptably low to indicate this on the certificate as a motivation. Examples of this are where a recent whole-herd test has indicated freedom of certain diseases and the herd has been closed since the test. Failing to achieve the set cut-off points on any one of the mandatory or recommended examinations or tests renders the bull not certifiable for breeding soundness. So, for example, if the bull is found to have a scrotal circumference below the accepted norms, or be positive for Trichomonosis, the practitioner gives the client a report stating reasons for unsoundness and a prognosis and possible remedies. This may still permit sale of the bull should the defect or defects causing him to be unsound not be of a nature that the bull will be infertile. Such a sale is termed a conditional sale.

Books of certificates in English and Afrikaans were printed and made available to veterinarians. The books contain 50 certificates, each with the Explanatory notes and minimum standards on the reverse, and with a carbon copy which is left in the book after removal of the original. Each certificate

bears the logo of the South African Veterinary Association.

Qualitatively assessed, uptake of the standards has been good. Assessment of acceptance is facilitated by the small size of the rural practitioner fraternity in South Africa and the good communication channels. Sale of certificate books continues, with a second print run required. Only minor changes were necessitated for the second print run as a result of comments received from users of the certificate.

4. Discussion

The first breeding soundness certificate published by the South African Veterinary Association in 1989 was a one-page certificate allowing for identification of the animal and giving blank spaces for the practitioner to list the tests and examination procedures performed. No guidelines or explanatory notes were issued with the certificate, and no standard manual was published. This led to a variation in the manner in which the certificate was used.

During consultation with different parties it became apparent that bulls used in different scenarios were subjected to different expectations and that the risk profile depended on the use of the bull. Provision was therefore made for the application of different standards depending on the purpose for which the bull is to be used. The three main purposes for which bulls are examined by South African practitioners are for use as natural service sires, as donors of semen for distribution, and for insurance purposes. These were therefore defined in the guidelines as three different 'use classes' with differing requirements.

The ease of completion of the certificate is considered to be a major feature of the document. Each relevant piece of information is filled in manually in the spaces provided.

Due to the requirement for a document which could accompany an animal at the change of ownership, each bull is dealt with as an individual. Group reporting is commonly practiced by practitioners in South Africa, but a standard is not set for the format for such reporting.

The view of the breeding soundness certificate as a quality assurance tool is integral to the final product. Thus, for the sake of clarity, a bull is classified as either being breeding sound or not. Bulls found to be breeding sound are eligible to be certified as such using the standard document. Bulls deemed not to be breeding sound are dealt with by means of the communication of findings and recommendations to the producer in verbal or written reporting according to the preference of the practitioner. This differs from the Society for Theriogenology and the Australian standards, both of which include intermediate categories. The Society for Theriogenology standard makes provision for classification to be deferred pending further evaluations in bulls which do not fully satisfy the criteria for a satisfactory potential breeder [9]. The Australian standard classifies bulls as fertile, subfertile or infertile depending on the parameters for different traits [10].

Due to the inability to demonstrate a clear advantage in fertility of bulls with differing values for parameters above the threshold value, there is no provision for specifying the value for each of these parameters on the certificate which emanates from the evaluation. For example, a bull with semen with a mass motility of 3 need not be any less fertile than one with semen with a mass motility of 4 or 5, with some variability being due to differing environmental conditions at the examination site.

The unambiguous nature of the information contained in the document contributes to the ease of interpretation. This is further facilitated by the page of explanatory notes and minimum standards, which specifies the standards applied for the sake of clarity to all parties.

Disputes arising out of bull sales are often characterised by a lack of communication between the different parties involved in the transaction. It was therefore deemed important to encourage communication between parties by ensuring that the identity and contact details of both the seller and the certifying practitioner are indicated on the certificate. Continuity between practitioners is also addressed by a general recommendation that the certificate be shown to the buyer's veterinarian on arrival of the bull. This places them in a position to

assess what further measures need to be taken before the bull is used.

Another principle embodied in the certificate is that of transferring some responsibility to the buyer to ensure certain aspects of the performance of the bull, particularly those that are not tested for in the practice setting and for which the lay observer can gather useful information. Thus, it is specified in the explanatory notes that the user observes the bull for satisfactory libido and serving ability when he is used. Care must be taken in assessing the serving ability of bulls to minimize the stress imposed on restrained animals and the potential for disease transmission.

While use of the certificate and the principles embodied therein has been good, further marketing of the concept of bull breeding soundness certification and of this standard in particular is required to improve penetration into the market. Other future prospects include the possibility of distributing the certificate in electronic template form and to automate the completion of the form from hospital records.

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